AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A multiwell plate assembly comprising:

a circuit board comprising one or more electrodes extending from said circuit board;

a first tray comprising an array of sample wells having holes formed therein and placed over said electrodes so that said electrodes extend up and into at least some of said sample wells~~, wherein each sample well comprises an electrode having an electrical connection that passes through an opening in a wall of said sample well~~;

a second tray comprising a plurality of cell layers such that said second tray can be coupled to said first tray to form a plurality of assay chambers such that each assay chamber comprises:

a first compartment;

a second compartment; and

at least one intact or permeabilized cell layer separating said first compartment from said second compartment.

2. (Original) The multiwell plate assembly of Claim 1, wherein the first compartment and second compartment of each assay chamber each comprise at least one electrode.

3. (Currently Amended) The multiwell plate assembly of Claim 1, wherein said cell layers are in a substantially horizontal orientation on a bottom surface of said second compartments.

4. (Original) The multiwell plate assembly of Claim 1, wherein said first compartment contains a different ion concentration from said second compartment.

5. (Original) The multiwell plate assembly of Claim 1, wherein said first compartment and said second compartment contain substantially equal ion concentrations.

6. (Original) The multiwell plate assembly of Claim 1, wherein said compartment contain one or more ions selected from the group of sodium, potassium, calcium, bicarbonate, phosphate, and chloride.

7. (Original) The multiwell plate assembly of Claim 6, wherein at least one of said compartments contains chloride ions.

8. (Original) The multiwell plate assembly of Claim 1, wherein said layer of cells is formed with substantially ion impermeable intercell junctions.

9. (Original) The multiwell plate assembly of Claim 1, wherein said layer of cells comprises epithelial cells.

10. (Original) The multiwell plate assembly of Claim 1, wherein said layer of cells is disposed on a microporous membrane.

11. (Original) The multiwell plate assembly of Claim 1, further comprising a voltage clamp.

12. (Original) The multiwell plate assembly of Claim 1, further comprising a current clamp.

13. (Original) The multiwell plate assembly of Claim 1, wherein said first tray and said second tray are 24-well multiwell plates.

14. (Original) The multiwell plate assembly of Claim 1, wherein said first tray and said second tray are 96-well multiwell plates.

15. (Currently Amended) A method of forming a multiwell plate assembly comprising:

placing ~~providing~~ a first tray comprising a plurality of sample wells onto a circuit board comprising one or more electrodes such that said one or more electrodes extend from said circuit board into at least some of said sample wells~~, each sample well of said plurality of sample wells containing one or more electrodes~~; and

~~substantially simultaneously~~ placing a plurality of cell layers into said plurality of sample wells.

16. (Original) The method of Claim 15, wherein said plurality of cell layers are attached to a second tray.

17. (Original) The method of claim 16, wherein said substantially simultaneously placing a plurality of cell layers into said plurality of sample wells forms a plurality of assay chambers such that each assay chamber comprises:

a first compartment;

a second compartment; and

at least one cell layer separating said first compartment from said second compartment.

18-39 (Cancelled)

40. (New) The multiwell plate assembly of Claim 1 additionally comprising an upper circuit board comprising one or more electrodes extending from said circuit board and into sample wells defined by said second tray.

41. (New) The multiwell plate assembly of Claim 40 wherein said upper circuit board and said lower circuit board sandwich said multiwell plate assembly.

42. (New) The multiwell plate assembly of Claim 9 wherein said epithelial cells comprise CFTR.

43. (New) The multiwell plate assembly of Claim 1 additionally comprising one or more gaskets between said printed circuit board and said sample wells.